

# LUYAO LIU

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## EDUCATION

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East China Normal University   Master of Physical Chemistry, <i>colloidal crystal</i>	2021.9- Present
East China Normal University   Bachelor of Chemistry	2017.9- 2021.6

## RESEARCH EXPERIENCES

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<b>PU to decorate fabrics for construct structural color fabrics with high crystallization</b>	2023.2-Now
<ul style="list-style-type: none"><li><b>Highlights:</b> Construct high intensity photonic color fabrics on satin and sateen polyethylene terephthalate fabrics; PU film weaken capillary force and guide silica particles' assembly on the up layer of fabrics through wrapping the fiber of the yarn in polyester fabrics with low dosage PU decoration; Up layer photonic crystal provides high intensity structural color using less silica particles</li><li><b>My Role:</b> Responsible for designing and conducting experiments, data analysis, and academic writing</li></ul>	
<b>Green synthesis of structural colored fabrics by spraying aqueous colloidal solutions</b>	2022.7-2023.1
<ul style="list-style-type: none"><li><b>Highlight:</b> Develop a one-step spraying method using an aqueous solution of SiO<sub>2</sub> particles to prepare SiO<sub>2</sub>/PET fabrics with saturated and uniform structural colors.</li><li><b>My Role:</b> Responsible for designing and conducting experiments, data analysis, and academic writing</li></ul>	
<b>Precise Assembly of Highly Crystalline Colloidal Photonic Crystals inside the Polyester Yarns</b>	2021.9-2022.3
<ul style="list-style-type: none"><li><b>Highlights:</b> Develop spray coating synthesis for breathable and durable fabrics with saturated structural colors as the precise colloidal assembly in the yarn avoids the blocking of weaving holes and cracks.; High surface tension and high boiling point for the solvent of colloidal solution, as well as low twist angle, large weave cycles, and large tightness for the fabric substrate, are found to be favorable to the formation of high-quality PC-modified fabrics.</li><li><b>My Role:</b> Responsible for conducting part of the experiment, and data analysis</li></ul>	
<b>Nitrogen and sulfur-enriched porous bithiophene-melamine covalent organic polymers for effective capture of CO<sub>2</sub> and iodine</b>	2019.10-2020.10
<ul style="list-style-type: none"><li><b>Highlights:</b> Low-cost bithiophene and melamine were constructed into a new nitrogen and sulfur-enriched organic framework (TPFM) by one-pot Schiff-base type reaction without any catalysts and post-treatment procedure; Pore channels with abundant -NH groups on TPFM presents efficient carbon dioxide adsorption capacity with 77.5 cm<sup>3</sup>·g<sup>-1</sup> (about 16 wt%) at 273 K; The donated lone pair electrons in S and N atoms on TPFM contributed to its fast and efficient iodine adsorption capacities of 293.3 mg·g<sup>-1</sup> in cyclohexane solution.</li><li><b>My Role:</b> Responsible for designing and conducting experiments, data analysis, and academic writing</li></ul>	
<b>Multifunctional N-S doped porous carbon material derived from melamine thiophene</b>	2018.10-2019.10
<ul style="list-style-type: none"><li><b>Highlights:</b> Using thiophene formaldehyde and melamine as raw materials, prepare a nitrogen-sulfur co-doped porous carbon material by thermal conversion, and improve the material properties through metal coordination optimization to obtain N and S element doping of COF skeleton, conduct a highly active electrocatalyst that is modified without the metal.</li><li><b>My Role:</b> Responsible for designing and conducting experiments, data analysis, and academic writing</li></ul>	
<b>Ultrafine Cu<sub>6</sub>Sn<sub>5</sub> nanoalloys supported on nitrogen and sulfur-doped carbons as robust electrode materials for oxygen reduction and Li-ion battery</b>	2019.3-2019.11
<ul style="list-style-type: none"><li><b>Highlights:</b> Cu<sub>6</sub>Sn<sub>5</sub>@S-N-C displayed efficient ORR performance and unexpected durability in both basic and acidic electrolytes; Cu<sub>6</sub>Sn<sub>5</sub>@N-S-C gave the electrochemical lithium ion storage capacity of 905 mA h g<sup>-1</sup> in an initial discharge.</li><li><b>My Role:</b> Responsible for conducting part of the experiment, and data analysis</li></ul>	
<b>Sn(OH)<sub>x</sub>-assisted synthesis of mesoporous Mn-porphyrinic frameworks and their carbon derivatives for electrocatalysis</b>	2018.5-2019.3
<ul style="list-style-type: none"><li><b>Highlights:</b> 5,10,15,20-Tetrakis (4-aminophenyl) Mn-porphyrin and 2,4,6-trihydroxy-1,3,5-benzenetricarbaldehyde were combined into a new mesoporous organic framework by a Schiff-base-type reaction. Specimen was catalyzed for oxygen electroreduction in both alkaline and acidic media. Half-wave potential reached 0.86 V in 0.1 M KOH, with a very low yield of HO<sub>2</sub><sup>-</sup> (4.02%) and better durability.</li></ul>	

- **My Role:** Responsible for conducting part of the experiment, and data analysis

## PUBLICATIONS

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| • Green synthesis of structural colored fabrics by spraying aqueous colloidal solutions<br><i>Liu Luyao, He Yuying, Fu Qianqian, Ge Jianping*</i><br><i>Journal of East China Normal University (Natural Science)</i>  | 2023.2  |
| • Precise Assembly of Highly Crystalline Colloidal Photonic Crystals inside the Polyester Yarns: A Spray Coating Synthesis for Breathable and Durable Fabrics with Saturated Structural Colors<br><i>Yuying He, Luyao Liu, Qianqian Fu, Jianping Ge*</i><br><i>Advanced Functional Materials</i>                           | 2022.3  |
| • Nitrogen and sulfur-enriched porous bithiophene-melamine covalent organic polymers for effective capture of CO <sub>2</sub> and iodine<br><i>Luyao Liu, Chunmei Song* and Aiguo Kong*</i><br><i>Material Letters</i>   | 2020.10 |
| • Ultrafine Cu <sub>6</sub> Sn <sub>5</sub> nanoalloys supported on nitrogen and sulfur-doped carbons as robust electrode materials for oxygen reduction and Li-ion battery<br><i>Xiaoying Zhang, Luyao Liu, Jiaxin Liu, Tingting Cheng, Aiguo Kong,* Yu Qiao, Yongkui Shan*</i><br><i>Journal of Alloys and Compounds</i> | 2020.5  |
| • Sn(OH) <sub>x</sub> -assisted synthesis of mesoporous Mn-porphyrinic frameworks and their carbon derivatives for electrocatalysis<br><i>Xiaoying Zhang, Luyao Liu, Yu Qiao, Jiaxin Liu, Aiguo Kong* and Yongkui Shan*</i><br><i>Dalton Transactions</i>  | 2019.10 |

## EXTRA ACTIVITIES

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| <b>Asian Universities Student Entrepreneurship Ideation Challenge (AUSEIC) Competition</b>   | Shanghai |
| • <b>Description:</b> We focus on education backward areas, provide a combination of online and offline education resource assistance model, and are committed to breaking the problem of educational information barriers in poor areas | 2021.12  |
| • <b>Achievement:</b> Won the second prize of the East China Normal University internal selection competition  |          |

## VOLUNTEER WORKS

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| <b>Miaomiao Reading Instruction Activities in Maqiao Experimental School</b>   | Shanghai |
| • <b>Description:</b> Guide students to read children's picture books and talk about some extra knowledge about stories to broaden their perspectives and to inspire their interests   | 2019.10  |
| <b>Tianjie Community Volunteer</b>   | Shanghai |
| • <b>Description:</b> Accompany primary school students to solve learning problems, whose parents have low educational backgrounds and are migrant workers, and these parents do not have time to accompany their children to solve educational problems   | 2019.9   |
| <b>Education Helps Social Practice Activities</b>  | Shanghai |
| • <b>Description:</b> Accompany middle school students in areas with backward science and technology and backward educational resources, and carry out extracurricular interest activity groups for them, and provide interest activity groups such as aerobics, modular programming, board games, and stage plays | 2017.8   |

## AWARDS

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| • The First Prize of ECNU Elite Class Scholarship (TOP 5%) | 2020.11 |
| • The Third Prize Scholarship of ECNU (TOP 25%)            | 2020.11 |
| • National Encouragement Scholarship (Top 13%)             | 2019.11 |
| • The First Prize of ECNU Elite Class Scholarship (TOP 5%) | 2019.11 |
| • The First Prize Scholarship of ECNU (TOP 10%)            | 2018.11 |

## SKILLS&HOBBIES

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|---|---------|
| • Language Skills: English (TOEFL 88, Speaking 23, Aug.2023), Mandarin (Native) | 2020.11 |
| • Tools: Origin, 3DMax, C4D, PS, Pr, Git  | 2020.11 |
| • Hobbies: Jogging, Baking, Watching Formula 1 Grand Prix and documentaries     | 2019.11 |